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THE ELEVENTH ANNUAL BANQUET

of

ST. LOUIS BRANCH A. E. S.

will be held in the "American Annex" on

SATURDAY, JANUARY 19, 1924

The Educational Session will begin at 3:30 p. m. Dr. William Blum of the Bureau of Standards will give an informal lecture on "Nickel Deposition" illustrated with exhibits and experiments,

Other papers will also be presented by members.

Ladies will be entertained at Theatre Party while educational session is on.

Dinner at 6:30 p. m., followed by short program.

Dancing at 8:30 p. m. Members, employers and friends invited.

RESERVATIONS, $2.00 PER PLATE

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SEASON'S GREETINGS

Again the season of the year has come when all the world stands still to celebrate the birth of the Greatest Personage of all time, and no matter what our conception may be of this Personage, whether we hold Him as being human or divine, His life and ideals have exerted a greater influence for good than any other person in all history. Not great because of the material weath acquired or because of buildings He erected, to perish with time, but great because the whole world has been made better because He lived. It is fitting that we should observe a day in commemoration of His birth, reflect on His character, and emulate His life, thus contribute to the betterment of mankind and to make alive the spirit of Peace and Good Will toward **all men.** And so we take the opportunity to convey Christmas Greetings to every member of the A. E. S. with the hope that peace and good will may ever be a dominant force in our society.

Oh yes, we must not forget that the seasosn of cheer and good will is followed by the inventory period business and personal. Has the year been a success financially? What advancement have we made personally? In character? In knowledge? In usefulness? In good fellowship? Such questions as these remind us that it is also a good time for some **new resolutions. Resolved**

"To keep my health! To do my work! To live!
To see to it I grow and gain and give!
Never to look behind me for an hour!
To wait in weakness, and to walk in power;
But always fronting onward toward the right
Robbed, starved, defeated, fall, wide astray—
On with what strength I have!
Back to the way!"

NOTE ON THE ELECTRODEPOSITION OF ZINC-CADMIUM-MERCURY ALLOYS FROM CYANIDE SOLUTIONS

By Charles H. Proctor and C. J. Wernlund

Recently patents on an improved process of zinc plating in a bath containing mercury have been granted. In connection with laboratory work on the processes involved, it was of interest to see what effect the addition of cadmium had on the mercury-zinc alloy. The following short paper is the result of some experiments along this line.

APPARATUS—The electrolyzing vessels were 1 L. rectangular Volrath enamelware dishes 5"x5"x3" (deep). The ammeter and voltmeter used were Weston calibrated precision instruments.

MATERIALS—Two alloy anodes of the compositions given below were used for each electrolysis. They were made from electrolytic zinc and cadmium and purified distilled mercury. The solutions used for electrolyses were prepared from the following grade of chemicals:

Sodium cyanide—96.98%.
Zinc syanide—55% Zn.
Cadmium hydrate—C. P. material.
Sodum hydroxide—C. P. material.
No mercury salts were used in making up the solutions.

PROCEDURE—In the experiments reported the procedure was to employ ternary anodes of the desired composition in an electrolyte containing:

Sodium cyanide.....	45.0	G/L	6	Oz/Gal.
Zinc cyanide	30.0	"	4	"
Cadmium hydrate	7.5	"	1	"
Sodium hydroxide	30.0	"	4	"

Using a given set of anodes and sheet steel cathodes the electrolysis was now run continuously for 48 hours under the following experimental conditions:

Anode area .....24 sq. in.
Cathode area .....12 sq. in.
Cathode current density 24 Amps/SF E.M.F. . .4.0-4.4 volts
Distance between anodes and cathode.....2 inches
Temperateur .....24°-27°C.

Sample deposits for analysis, salt spray tests, etc., were

then made. The results obtained from two widely varying alloys are briefly described:

ALLOY ANODE "A"—This alloy consisted of:

Zinc	72%
Cadmium	25%
Mercury	3%

DESCRIPTION OF DEPOSITS—The deposits from Alloy Anode "A" were smooth, fine grained and adherent. They were uniformly of a grayish white color. An interesting feature of this plating solution was that smooth, malleable iron pipe fittings and cast iron condulets which could not be successfully plated in a regular zinc cyanide solution free from mercury, were plated without difficulty. The reason cyanide solutions do not plate cast iron satisfactorily is because hydrogen only is deposited. This indicates that the discharge potential of hydrogen is below that of zinc in this particular case. In order to be able to electrogalvanize such cast iron it is essential that the discharge potential of the deposit, or of the hydrogen, or both, be altered so that the hydrogen discharge potential is about equal to, or perferably above that of the metal being plated out. This has already been emphasized by Haas, in U. S. P. No. 1,451,543.

Comparison of Anode and Cathode Current Efficiencies Using Alloy "A"

Coulometer determinations were not made, but the following anode losses and cathode gains in weight during given periods of electrolysis, in different runs, indicate that a good balance was maintained between these two processes:

25 hours	33.60 g.	31.60 g.
24 "	33.60 g.	31.60 g.
16 "	21.00 g.	22.98 g.
24 "	31.00 g.	30.11 g.

An analysis of a thick deposit after 48 hours of electrolysis with the above anodes gave:

Zinc (by difference)	73.4%
Cadmium	5.0%
Mercury	2.4%

These results show that the composition of the anodes is reflected to a remarkable degree in the deposits.

ALLOY ANODE "B"—In order to see whether a small-

er amount of cadmium in the anodes would prove satisfactory for rust proofing cast iron, anodes were prepared containing:

Zinc	92.0%
Cadmium	4.0%
Mercury	3.0%

Using these anodes under the same experimental conditions as before, it was found that smooth maleable and cast iron castings were plated without difficulty. The appearance of the deposits closely resembled those described above.

An analysis of the deposit in this case after 48 hours electrolysis gave:

Zinc (by difference)	91.9%
Cadmium	4.9%
Mercury	3.2%

These experiments indicate that ternary alloys of varying proportions of zinc, cadmium and mercury can be readily deposited from aqueous cyanide solutions. The peculiar ease with which cyanide solutions deposit such alloy is again demonstrated. It seems probable that this phenomenon is closely related to the high cathode polarization values which generally exist at the higher current densities in such solutions.

SALT SPRAY TEST DATA—The following salt spray test data of weighed deposits of these alloys on sheet steel is of interest. In the fourth column the rust resistance in hours for 0.01 oz. of metal deposit per square foot of surface has been calculated. Salt spray test data of cyanide cadmium deposits is added for comparison:

TABLE II

Alloy "B" Deposits (Salt Spray Test Data)

Sample No.	Wt. of deposit in Oz/SF.	Time required for rusting	Rust resistance of 0.01 oz. of deposit per sq. ft. (calculated)
1	0.108	86 hours	7.95 hours.
2	0.105	86 "	8.20 "
3	0.114	86 "	7.54 "
4	0.115	86 "	7.52 "
5	0.114	96 "	8.40 "
6	0.113	86 "	7.60 "

Average rust resistance of 0.01 oz. of alloy deposit per square foot of surface=7.87 hours.

TABLE I

Alloy "A" Deposits (Salt Spray Test Data)

Sample No.	Wt. of deposit in Oz/SF.	Time required for rusting	Rust resistance of 0.01 oz. of deposit per sq. ft. (calculated)
1	0.055	64 hours	11.6 hours.
2	0.055	64 "	11.6 "
3	0.080	68 "	8.5 "
4	0.093	80 "	8.6 "
5	0.114	77 "	6.8 "
6	0.118	92 "	7.8 "
7	0.131	92 "	7.0 "
8	0.148	96 "	6.5 "
9	0.157	96 "	6.1 "
10	0.170	(over) 96 "	

Average rust resistance of 0.01 oz. of alloy deposit per square foot of surface=8.28 hours.

TABLE III

Cadmium Deposits (Salt Spray Test Data)

Sample No.	Wt. of cadmium in Oz/SF.	Time required for rusting	Rust resistance of 0.01 oz. of cadmium per sq. ft. (calculated)
1	0.127	104 hours	8.2 hours.
2	0.127	142 "	11.2 "
3	0.148	118 "	8.0 "
4	0.161	166 "	10.3 "
5	0.165	144 "	8.7 "
6	0.216	190 "	8.8 "
7	0.241	166 "	6.9 "
8	0.300	195 "	6.5 "

Average rust resistance of 0.01 oz. of cadmium per square foot of surface=8.575 hours.

These tests indicate that a given weight of deposit of Alloy 'A" gives a rust protection approximately equal to that of pure cadmium. Alloy "B" has a slightly increased rate of corrosion.

RESISTANCE OF NICKEL SOLUTIONS

E. W. Heil

Resistance is that inherent property of a conductor, which opposes the passage of electricity. It is measured in ohms and is the only unit of electrical measurement for which a material standard can be made; other quantities being measured by the effects they produce. Plating solutions or electrolytes will conduct an electric current and are at the same time decomposed by it. They are conductors of the second class while metalic conductors, such as are used for bus bars, are conductors of the first class. The two classes of conductors behave alike in some ways and differ greatly in others. In an electrolyte, the resistance increases as the length of the circuit increases, and diminishes as the sectional area increases, same as all conductors; hence, the total resistance of a plating vat would increase if the anode and cathode were placed farther apart, and would decrease if the active surfact of anode and cathode were increased. The specific resistance of solutions is much greater than that of metalic conductors being anywhere from one to twenty million times as great. Another difference in the behavior of the two classes of conductors is the way the resistance changes with the temperature ;in metalic conductors the resistance increases with a rise in temperature, while in the electrolytes the resistance decreases with a rise in temperature.

The total resistance of a plating tank is of great importance, as it determines the maximum current that will flow at the applied voltage; hence, it can be readily seen that a change of temperature would greatly effect the current flow and incidently the rate of deposition.

The ohmic resistance of a conductor will not change with any fluctuations in the current. If the resistance is forty ohms when ten amperes are flowing, it will remain the same if the current should be increased to three or four hundred amperes. Of course, if the increased flow of current should cause a change, in temperature of the conductor, the resistance would change according as to whether it is a conductor of the first class or second class.

If current is caused to flow against the resistance of a conductor, work is being done. If the resistance of a plat-

ing tank circuit is large, due to faulty connections, dirty anodes or undersized bus bars, much of the electric energy wil be changed to heat energy and be wasted so far as the plater is concerned.

If the dynamo maintains five volts pressure across the bus bars and the plating vat requires but two, so that a variable resistance is installed to reduce the voltage to two across tank mains, then three fifths of the electrii energy in that circuit is wasted, heating the rheostat. So the question is sometimes asked, what is gained by increasing the conductivity of the solution, if it is necessary afterwards to add more resistance at the rheostat.

Under these conditions no power would be saved and if the additional salt did not improve the deposit or improve electrolosis, so that greater current densities may be used, thereby increasing the rate of deposition, nothing would be gained, also if additional salt were not needed it would be a detriment.

Aside from lessening the resistance additional salts have an effect on the structure of the deposit, which does not come under this subject. Lessening the resistance of a nickel solution is favorable to the throwing power, because it brings the conductivity nearer to that of the articles being plated, so that less current is deflected by the metal instead of passing through the solution to reach the low places. It is but a small matter compared to other factors governing the throwing power and that is another story.

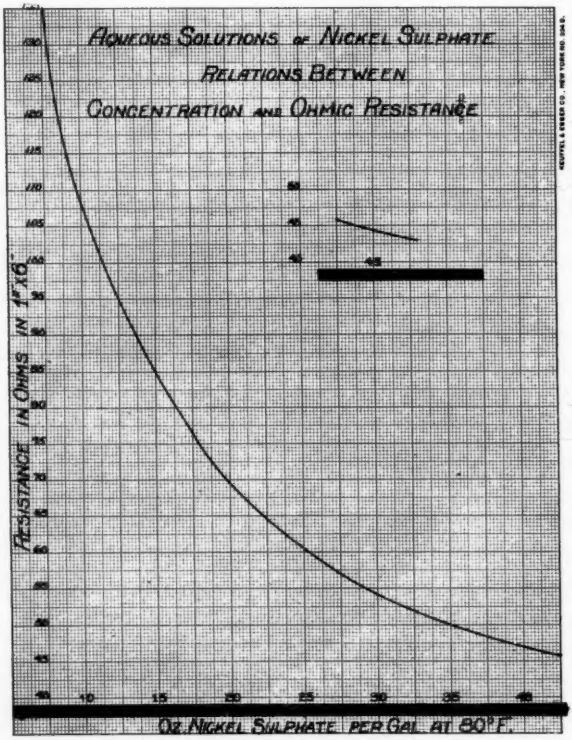
The addition of a conducting salt to a nickel solution having insufficient nickel content to carry on electrolosis at the increased current density is bad practice, because it will cause an evolution of gas at the cathode, detrimental to the deposit.

So the question confronts the plater, just when does a nickel solution require a conducting salt and how much? It is not always safe to judge by the voltmeter and ammeter to determine this, as dirty anodes and connections, insufficient anode surface or perhaps the way the tank is loaded would effect the readings and be mis-leading. The surest and easiest way is to measure the resistance with a wheatstone bridge.

When a plater makes up a new nickel solution, he usual-

ly selects one of a number of well known formulas. If he has chosen wisely the solution will work good when made up, so then the best thing to do is to keep it that way. First: find out what the ohmic resistance of your original solution was—if you have to make up a small quantity., and measure it for resistance. Next: be sure that your working solution is not low in metal, if so, add nickel salt and then measure the resistance. If the resistance is too high then conducting salt is needed. The plater must decide for himself what nickel solution gives the best satisfaction on his class of work and afterwards keep it balanced, ie; the amount of conducting salt to the nickel salt.

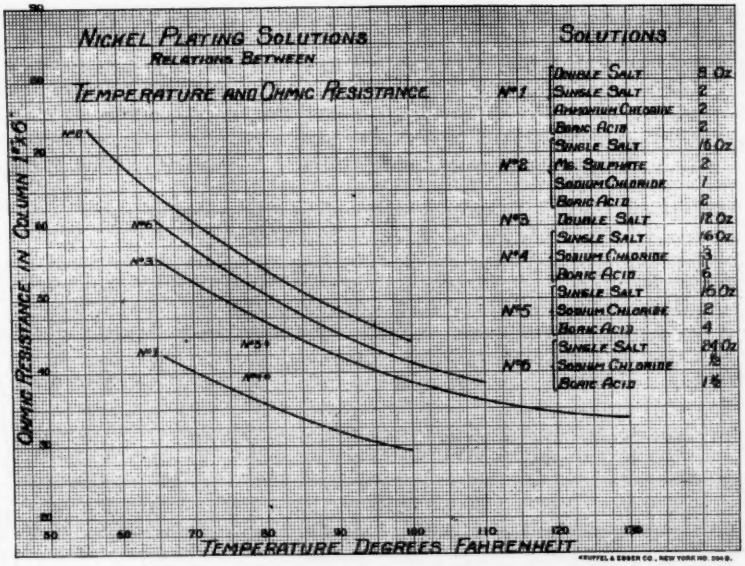
In connection with this paper, you will receive two Graphs, in which the curves were plotted from measure-


Aqueous Solutions of Nickel Sulphate
Relations Between
Concentration and Ohmic Resistance
Resistance in Ohms in 1"x6"
Oz. Nickel Sulphate per Gal. at 60° F.

Graph No. 1

ments, made by a wheatstone bridge. A different solution was accurately prepared with distilled water for each measurement. The salt was dissolvel in part of the water and water then added up to eight ounces, which was sufficient to fill the conductivity cell.

Graph No. 1—shows how the resistance of a solution, of nickel sulphate decreases as the nickel sulphate content is increased. All the measurements on this curve were taken at 80 dgrees F. Note how rapidly the resistance decreases at first, and then more slowly as solution nears point of saturation. It shows that a point can be reached where an addition of nickel sulphate will not produce a drop in the resistance. (1) Examine the curve and note that sixteen ounces of nickle sulphate per gallon of water, has a resistance of 81.5 ohms at 80 degrees F. Most single salt solutions contain sixteen ounces of nickel sulphate per gallon and usually have a resistance of 40 to 50 ohms at 80 degrees F. The drop of 30 to 40 ohms being caused by the conducting salt.



Graph No. 2

Graph No. 2—was made by measuring the resistance of six different nickel solutions at increasing temperatures as high as 130 degrees F. A plater using a solution made after one of these formulas could tell by the curve what the resistance of his solution should be at any working temperature. It is interesting to note that while these solutions do not have the same resistance at a given temperature, when measured at increasing temperature, they plotted nearly parallel curves. In taking these measurements a conductivity cell was used in which the electrodes were six inches apart in a tube one and one eighth inches inside diameter; thus, the measurements on the Graphs indicate that a column of solution one square inch sectional area and six inches long would have that resistance. This puts it in terms more easily understood by the average plater. Graph No. 2, also shows the effect of a change in temperature on the resistance of a nickel plating solution.

Solution No. 3—which is a double salt solution varies ten ohms between 75 and 85 degrees F. This is worthy of consideration, especially at this time of the year. Plating solutions should be heated and if this is not done, it is necessary to increase the time of deposition to insure sufficient plate.

Of course, the rate of deposition may be maintained by increasing the voltage, but in case of a cold solution, this causes a brittle deposit.

Returning to our subject, which is resistance, Graph No. 2 affords a study of six resolutions measured for resistance over a wide working range of temperatures. The formulas are commonly used for nickel plating and any plater can examine this chart and learn what the resistance of his solution is or should be at any temperature, and note what effect a change of temperature would have.

[redacted]

Obituary

We regret to chronicle the sudden passing of our fellow member, S. F. Siegel, of St. Louis Branch, and extend to the bereaved family our heartfelt sympathy.

SILVER PLATING ON NICKEL SILVER

By Fred L. Greenwald, Member Chicago Branch

This article is not intended as something new in the way of silver plating on nickel silver, but merely a few observations extending over a period of time in doing this class of work, and some methods that have worked successfully in giving the results desired, both in quality and quantity.

About the first experience a plater has when he attempts to silver plate a piece of highly polished 18 per cent. nickel silver with the ordinary silver plating and cleaning methods is to find that the plate will not stick, or if it does only long enough to reach the scratch brush wheel or burnisher. Especially is this true if he tries to maintain the bright or polished surface.

By the ordinary silver plating and cleaning methods is meant to clean without an electric cleaner, to coat with a film of mercury and strike in a solution with a high cyanide content and a high current density. These three things seem to be the outstanding obstacles in the path of successfully coating a high per cent. nickel silver.

The methods and solutions following were used on pieces of various sizes and shapes, such as go to make up a complete line of household, hotel and dining car silver service, ranging in size from a small butter dish to a 22-in. tea set waiter. The majority of this class of work has brittiania metal mounts or trimmings and quite a few pieces have brass or copper rivets, making, in some cases, a piece of work that has four different metals to be plated, to say nothing of the solder that is used to apply them.

The object we had in view was to get a plate that would stick, get it out quick and bring it out of the bath with a surface that required a minimum amount of labor to finish. To do this we give it a semi-bright or skim milk plate instead of a dead white plate. This is accomplished by the addition of a carbon di sulfide brightner. The advantage of the use of such a solution is twofold: First, you can take the work as it comes from the plating solution and give it either a bright finish or a dull platinum finish without any previous scratch brushing or sanding. The second advantage is that while we use carbon di sulfide to obtain the bright finish we at the same time have a solution that

enables us to use more amperes per square foot, thereby increasing the output of a tank.

Some authorities on plating claim that a silver plating solution containing carbon di sulfide as a brightening agent should not be used on heavily plated work. We have not been able to ascertain just why this should be, as we have obtained uniformly good results on all grades, light, medium and heavily plated ware, with no apparent sacrifice of quality and very seldom a piece of failed work.

All parts that have been silver soldered should be properly pickled to remove borax and scale over which the plate will not adhere. The old reliable hot sulfuric acid pickle will do this very well.

To obtain best results, work should come to plating room color buffed and as free from buffing compositions as possible, this makes it unnecessary to ruin the finish through excessive cleaning. When work comes in this condition it is wired or racked according to size and shape of piece and then soaked a few minutes in a mild cleaner; by mild cleaner is meant one that will not attack brittiania metal or discolor copper or brass before the buffing compositions are loosened. When pieces come out of the cleaner loose particles of dirt are removed from corners and crevices with a bristle brush and such pieces as coffee pots, sugar bowls, etc., are scoured inside on a scratchbrush lathe, conveniently located. The work is then swabbed all over with a cotton swab to remove any smutt or scum that might have collected.

It is then run through a good electric cleaner, using a current pressure of from 6 to 8 volts. The double throw switch can be used, but I have found that it is not necessary, and good results can be obtained with just the straight current; that is, having the work connected on negative or cathode rod and the iron tank connected to positive pole. Care should be taken to have the steam coil insulated, otherwise you are liable to run into difficulties of various kinds. If work is going through with silver on either in the form of solder or plate the double throw switch should not be used, as the silver will turn black and have to be refinished before proceeding with plating.

After leaving the electric cleaner the parts are run

through a hot rinse. This gives better results than going direct into cold water and avoids a "drying stain."

Hot rinse is used to replenish the electric cleaner. Work is then run through cyanide and hydrochloric acid dips in the order named, rinsing thoroughly in cold water between dips.

The use of mercury or any other preliminary coating other than the silver strike, we find to be not only unnecessary but detrimental to the final finish. It is claimed that mercury causes cracks in the base metal after it ages, especially in metal that has been drawn and formed.

After being put through the cyanide and hydrochloric acid dips and being rinsed it is ready for the silver strike which is composed of 7 ozs. free cyanide and .25 ozs. silver to each gallon and is worked with carbon anodes covered with cloth bags to prevent small particles of carbon from depositing on work. The current pressure should not exceed 3 volts and good results are obtained with less. It is not necessary to keep work moving in strike as is customary with higher voltages to avoid burning; it can be let hang while other work is prepared.

It is necessary to leave parts in strike less than one minute to receive sufficient coating to be transferred to regular bath for heavy deposit. Care should be exercised when putting work in strike to have it connected with cathode rod as soon as possible to avoid an immersion plate, which is not adherent.

The solutions for silver plating are made up with approximately 2¾ ozs. metallic silver and 3 ozs. free cyanide per gallon with additions of carbon di sulfide brightener when the appearance of work indicates. This brightener is made with ½ oz. carbon di sulfide in a solution containing ½ gal. water and 3 ozs. cyanide, it must be agitated at intervals for a week or ten days or until carbon di sulfide is all taken up. Then add an equal amount of silver plating solution and let stand until a black sediment forms; this is silver sulfide and should be filtered out of brightener before using.

Should the brightener be added to plating solution without removing black sediment it will cause spots and pits on surface of work. This occurs when brightener is added di-

rect to plating bath without first mixing with a portion of plating solution, letting stand and filtering.

With this method there is less danger of getting too much brightener into a tank.

In order to get good results with solution containing brightener and get them consistently, it is necessary to maintain the proper balance between the various ingredients in the solution, also the temperature. If the temperature of the solution runs up to 80 degrees F. it requires brightener added oftener than one worked at 68 or 70 degrees F., at which temperature it works good. When a silver solution gets loaded too heavily with carbonates the brightener does not seem to take effect, at which time some of the carbonates should be removed, either by freezing out in th form of crystals, or when weather is warm, by precipitating with barium cyanide, letting white precipitate settle and either syphon off clear solution or filter (the latter is not practical with large solutions).

A plating solution of this description will allow the use of 6 amperes per square foot at which rate a good plate can be deposited in a short space of time.

We use a moving cathode rod.

A fairly good anode surface is maintained, having 18 anodes, 3ffl8 in., nine on each side of a tank six feet long, with a capacity of 125 gals. Our tanks operated in this manner are practically self-sustaining, as about all that is added is occasionally a fraction of an ounce of cyanide per gallon and the only time that silver has been added in the form of silver cyanide or chloride is when the anode surface got low and the metal was drawn from the solution. The anodes are left in the solution all week, and in that manner we gain what metal is dissolved from them while the solution is not operating.

This method of cleaning and plating gives good results in silver plating over nickel and also on replate silver parts, where it is not required to strip the old plate.

Brittiania metal will take a plate that will stand lathe or hand burnishing, providing it is color buffed and cleaned the same as nickel silver.

BRANCH NEWS

Toronto Branch

Toronto members and their friends to the number of over forty attended a very successful meeting of Toronto Branch on November 26.

The feature of the evening was an informal talk by Prof. J. T. Burt-Gerrans of the Department of Electrochemistry, University of Toronto. About one year ago, during a meeting of the Toronto Branch, Prof. Burt-Gerrans referred to certain researches caried out by students, under his direction, with reference to the electro-deposition of metal upon aluminum, and stated that he hoped to be able to give us some definite information relative to the methods employed and the results obtained. True to his promise, he described in detail the process developed at the University and exhibited some very convincing specimens of adherent copper deposits on sheet aluminum.

Briefly, the modus operandi was as follows: The aluminum article was suspended as anode in a 2 per cent. solution of sodium hydroxide for approximately twelve minutes, passing a current of 23 to 25 amperes per square foot anode surface at a voltage of from 25 to 45 volts and a temperature of from 25 to 35 degrees C.; then as cathode flashed in a cyanide copper bath for about three minutes, with a current density of about 2½ amperes per square foot and a voltage of 1¾ volts. The bath he used for this purpose contained 10 grams of free cyanide per litre, equivalent to one pound per ten Imperial gallons. The copper deposit was finished in an ordinary acid copper sulphate bath.

The samples shown were plated nearly two years ago and are now free from indication of spotting out, blisters or non-adherent coating. Some of the samples had been subjected to scratching with a knife, bending, heating to 175 degrees C. (367 degrees F.), hammering and heavy brushing with a steel scratch with no apparent loosening of the coating. The process slightly mattes a polished aluminum surface, but not sufficiently to make it impracticable to produce a lustrous finish on the deposited metal for decorative purposes.

In addition to the really splendid talk on aluminium Prof. Burt-Gerrans explained the new mathematical analysis and theory of current distribution and throw in electro-plating bath as developed by Mr. A. H. Heatley, M.A., formerly of Toronto University, and published by him in the Transactions of the American Electro-Chemical Society. The subject, which is indeed a very complex one, was presented in a masterly manner and the goodly number present were kept intensely interested throughout the address. Lively and instructive discussions followed both parts of the speaker's address.

Toronto electroplaters have spent several very profitable evenings during the past ten years listening to Prof. Burt-Gerrans. His sincerity, geniality and general interest in our welfare has won for him a warm place in our hearts. A hearty vote of thanks was extended to him for this, his latest contribution, to our electroplating knowledge.

Owing to date of December meeting being Christmas Eve, our next

regular meeting will be January 28. A special meeting will be called in December or early January, if necessary.

Boston Branch

Boston Branch met Friday, the 16th, at the American House, at 8 P. M., with President Nihan in the chair.

After the regular order of business the report of committee on the nickel itch the chairman stating that he has received letters from almost every State in the Union asking for a cure for the itch, and stated that he had send out letters to most of them, wih direcions of how to treat the itch, but as yet has received no replies to date, so that every member can now see how a thing of this kind will help every member to take care of himself. Boston Branch is doing all that it can to help this committee, and hopes that every member of the A. E. S. will do the same. The meeting adjourned at 10:15 P. M.

Grand Rapids Branch

Our November meeting was held Wednesday evening, November 14, 1923, at which time our program committee reported that the following program had been prepared for the coming five monthly meetings of Grand Rapids Branch:

December 12, 1923—Statuary finishing of metals, by Mr. A. Rickson.

January 9, 1924—Nickel plating bumpers and fishing tackle, by Mr. L. Noak and Mr. H. Austin.

February 13, 1924—Gold plating phonograph parts, by Mr. B. Wawley.

March 12, 1924—Production methods of handling work, by Mr. W. Allen.

April 9, 1924—The production of lacquer and lacquer troubles, by Mr. C. Werft.

Milwaukee Branch

Milwaukee Branch met November 8 at Lipp's Hall, 341 Third street, with President R. Goodsell in the chair. Roy Hunt was elected to active membership.

The convention committee is doing some very extensive work along their lines which has been mapped out for them by the president of the committee, R. Goodsell. The majority of the members feel they do not want to be caught with all the work the last month before the convention.

We are also making a drive among our members for a better attendance, which is meeting with good success.

Cleveland Branch

The following is the report of the November meeting, November 24, 1923: The Cleveland Branch of the A. E. S. met for their regular November business meeting at the Hotel Winton at 8 P. M., with Mr. Ter Doest in the chair. The minutes of the previous meeting were read and approved as read. Communications from Supreme Secretary read; also communication from Milwaukee Branch calling for papers to be read at

the convention was ordered laid on table to be reread. There were 13 members present. Papers were read by Mr. Smith, Hopwood and Ter Doest. The next meeting order suspended and a smoker held at the home of F. C. Cyrex. The secretary received the names of two prospective members and ordered to send applications. The meeting was adjourned at 10:45 P. M.

Pittsburgh Branch

Our meeting was well attended and proved one of the most interesting that we have ever held. The secretary of the branch reported the result of the Research Committee conference with the Bureau of Standards at Washington, D. C., held November 16 and 17, and in the opinion expressed the work being done by Dr. Blum and his staff will be of untold value to the plater and to the manufacturer. The work being done with nickel anodes will save many dollars for those who have to buy nickel anodes, as they will be able to demand the right kind of anode for their work. In appreciation of the work and interest the secretary has shown since our branch was organized the members presented him with a sum of money, with which he was instructed to purchase something that he mostly desired. The secretary surely appreciated the feeling as expressed and thanked the members for their action.

Detroit Branch

Regular meeting A. E. S. held Friday, December 7, 1923, with the largest attendance in two years, and enthusiasm was unbounded. Vice-President T. C. Eichstaedt presided in absence of President B. E. Miller. Visitors were Mr. Steinhegner, chemist of C. B. Shepard Company, who is a prospective member and who took an active part in the discussions, and our life member, Herbert J. Hawkins, who walked in on us with his bodyguard, J. J. Schultz. We were glad to see both of them again. Minutes of previous meeting were read and approved. Banquet committee appointed was: A. T. Wagner, chairman; C. S. Tompkins, Pat Bergin, R. L. Shepard, J. J. Schultz, T. C. Eichstaedt.

Question No. 1—What chemical change takes place when alum is heated to drive off all water to a powder form, and what action would this have upon addition of 4 ozs. of substance to 125-gallon solution of nickel? After discussion left open to find out just what form of alum it was.

No. 2—Suggestions for best type of plating barrel for brass parts, such as small knobs, bushings and stamped reflectors. Was advised that it was impractical to plate reflectors in barrel because of nesting and more important, marring of finish. Questioner will visit several of the factories in order to decide for himself the type of barrel most suitable for his line of work.

No. 3—If a 12-volt generator is used, delivering 1,000 amperes at that voltage, if same generator is connected to two tanks in series, each tank requiring 1,000 amperes, what amperage will be delivered to each tank (all rhesotats being eliminated) and the resistance halved thereby? Contention is that 1,000 amperes will flow through each tank because of series connection and rheostat elimination cathode surface being the

same in each tank and voltage and resistance is halved.

Would like comments on this question from the best electrical experts in the organization, with as simple and full explanation as possible. Please write the secretary of Detroit Branch.

Philadelphia Branch

Philadelphia Branch met Friday, December 7, with President Gehling in the chair and a good attendance. One new application was received. We had a letter from the convention committee asking for educational papers to be read at the convention. This was turned over to our librarian, Mr. Wm. Scott, who will collaborate with several other members on a paper. Banquet committee reported the annual banquet a big success in every way. Final report will be made at the January meeting, at which every member of the branch should be present.

A committee was organized to look up the members who have not been attending the meetings regularly, in an endeavor to renew their interest in the society and increase the attendance at each meeting.

Plating of aluminum and shop routine were discussed until late hour and meeting adjourned with a Merry Christmas to All.

The annual banquet of the branch was a big success in every way, there being 160 persons present.

The educational session held in the afternoon was well attended and those present were welcomed by Mr. Uhl with a few chosen remarks.

Mr. Charles Proctor and Mr. Sizelove of the research committee gave an outline of the work being done in conjunction with the Bureau of Standards furnished much food for thought.

Mr. Shadell of Reading Branch spoke on the plating of aluminum, using the chloride of iron and muriatic acid dip, and showed samples of different finishes.

Mr. Wm. Scott, Philadelphia Branch, read a paper entitled "Zinc Cyanide Solution," "A Complicated Article," illustrated with sample. Both papers brought forth quite interesting discussion. Quite an exhibit of finishes in colors, lacquer, enamels and supplies were shown by members.

At 7 P. M. all partook of the good eats and noises of the various favors. During the courses prizes were given to the holders of lucky numbers. Each lady received as a souvenir a plant in a fancy basket.

We had as guests Supreme President Sterling and Dr. Lukins, University of Pennsylvania. President Sterling spoke on the work of the society and tendered the greetings from the Supreme Officers. Large delegation from New York, Newark and Reading branches were present and the good time was concluded by dancing. Much credit and thanks are due the committee, and all those who assisted in the success of banquet.

Newark Branch

The regular meeting of the Newark Branch, A. E. S., held on December 9, at 17 Central avenue, Newark, N. Y.

The meeting was called to order by our worthy President, Royal Clark, at 8:10 p. m. Roll called of officers.

The Newark Branch had a visitor in our Mr. Charles H. Buchanan of Hinsdale, Mass., a man whom is loved by all platers we know, and who, no doubt, is one of the best informed men on nickel anodes in the country. Mr. Buchanan gave a very interesting talk on nickel anodes and predicts that there will be a big improvement in nickel anodes in the near future, and the A. E. S., with the help of the Bureau of Standards and such men as Dr. Blum and Mr. Buchanan, will produce anodes that will simplify the working of nickel solutions, thereby improving the deposits, which in turn improves the product.

Dr. Peter F. Kobble read a very interesting paper entitled "A Theoretical and Practical Gold Solution," which has been in use for the past forty years.

In the reading of this paper Dr. Kobble brought out some very interesting data on dip immersion, gold solution and which will appear in the REVIEW in the near future.

Providence-Attleboro Branch

The first meeting of the Providence-Attleboro Branch of the American Electroplaters' Society was held at 184 Washington street, Providence, R. I., room 308, December 6, 1923, at 8 o'clock.

After the usual business was over, Past President Senecal asked the question, What causes silver to turn off color or rather a pale blue while being plated? The plated articles are returned to their true color when dipped in hot water.

Past President Garrick believed the trouble could be remedied by the addition of silver cyanide. Arthur Wood was of the same opinion. Past President Andrews said the imperfection may be caused from many things, perhaps the lining of the tank may have something to do with it.

President Poyton suggested watching the ammeter closer and timing the deposits to see if the solution was getting lean in metal. President Poyton gave the following rule for keeping record of metal deposited: One ampere will deposit one grain of silver in one minute, if the solution and current is normal. This rule will work out close enough to gather a fair estimate of metal used. President Poyton also stated that the silver anodes pass through three stages before the silver is in a proper state to tb be deposited on the work.

Mr. Herrick of the Boston Branch was present and gave a talk on nickel itch, its causes and remedy. He told of the obstacles he had to overcome to get the medical doctors interested and the opposition he met before he could get a doctor's degree.

Now that he has got a doctor's certificate he can accomplish much more to overcome the nickel itch that has given the members of the plating game so much suffering in the past. He expects to publish in the MONTHLY REVIEW, before the next convention, an article on the relief of this rash.

Hartford-Connecticut Valley Branch

One of the most successful open meetings ever held by Hartford-Connecticut Valley Branch took place in New Britain on Monday, November

26. About fifty members and guests were present, including representatives from nearly all the New Britain factories.

Two new members were elected and Mr. George B. Hogaboom was received as a member by transfer from Waterbury Branch.

There were several questions in the Question Box. In the future Question Box cards will be furnished to all members, and it is hoped this will create more interest in that part of the meetings.

After all routine business had been transacted, President Vibberts welcomed the visitors and gave an outline of the objects and accomplishments of the society. He was followed by Mr. Hogaboom, whose subject was "A Pioneer in Nickel Plating." He told of the life of Dr. Adams, the originator of nickel plating from a sulphate solution of his early experiments in electro-chemistry, and of his long and finally successful struggle to obtain recognition of his achievement. It was an extremely interesting account of a remarkable man. He also spoke of the research committee's meeting in Washington, where much progress is reported in the work on nickel solutions, throwing power, nickel anodes and the deposition of alternate layers of copper and nickel on steel to prevent corrosion. In connection with this he advanced the opinion that members of the society could keep in closer touch with the work at the Bureau of Standards if every branch was to send a member to Washington several times a year to confer with Dr. Blum and his associates.

We were also favored at this meeting with a demonstration of an entirely new apparatus for determining the acidity of nickel solutions, by its inventor, Mr. E. D. Sterlin of Yale University.

This apparatus was first used for testing the acidity of soils at the Department of Agriculture, and it is only recently that the men engaged in electroplating research found that it was what platers have been seeking for a long time, namely, a quick and accurate method of finding the acidity of nickel solution.

Mr. Sterlin's apparatus is very simple in its operation and will soon prove indispensable to the control of nickel solutions.

Members of this branch were very much interested in the demonstration, and arrangements are being made to have sets made for their use.

Anyone who is interested in this method can communicate with Mr. E. D. Sterlin, 124 Prospect street, New Haven, Conn., who is willing to make sets of his apparatus for members of the society who desire to buy them.

Bridgeport Branch

Bridgeport Branch held its regular meeting Friday evening, December 7. We had a visitor from the Philadelphia Branch, Mr. Knecht, who favored with a few remarks. A general discussion on the place a chemist should be in a factory was the topic for the night.

We had at November open meeting Prof. Bahney, who gave a fine talk on gold and silver from the mine to knives and forks.

To say that the subject was interesting and well delivered would be putting it mildly.

APPLICATIONS FOR MEMBERSHIP

Philadelphia Branch

Samuel T. Lumbeck, Active .....3304 Washington St., Wilmington, Del.

Bridgeport Branch

Frank Pauly .....356 Peck St., New Haven, Conn.

Pittsburgh Branch

Lewis C. Gerth, Active .....2915 Breker St., N. S., Pittsburgh, Pa.

Chicago Branch

Walter H. Loveland, Active.....3304 W. Adams St., Chicago, Ill.
Charles Banks, Active .....4505 Milwaukee Ave., Chicago, Ill.
James C. Leppens, Active .....317 Dewey St., Michigan City, Ind.

Newark Branch

Emile Rupport

Hartford-Connecticut Valley Branch

E. D. Sterlin .....124 Prospect Ave., New Britain, Conn.

ELECTED TO MEMBERSHIP

Toronto Branch

Wilfred E. Redfern, Active .....56 Helena Ave., Toronto, Canada
Wm. H. Cumming, Active....2 Elliott St., Lambton Mills, Ontario, Canada

Pittsburgh Branch

Ralph W. Tillotson, Active .....2406 Plum St., Erie, Pa.

New York Branch

Joseph San Pietro, Active .....226 W. 28th St., New York, N. Y.

Bridgeport Branch

John F. Courtney, Sr. .....239 Winthrop Ave., New Haven, Conn.

Detroit Branch

Lot M. Everly, Active .....321 Eddy St., Saginaw, Mich.

Hartford-Connecticut Valley Branch

Harold J. White, Associate.....3 Prospect Court, Hartford, Conn.
William J. Robbillard, Active.....191 Enfield St., Thompsonville, Conn.

Milwaukee Branch

Ray Hunt, Active

Newark Branch

George Conley and Peter Koble

Providence-Attdeboro Branch

Roger C. Lawrence....c|o American Steel & Wire Co., Worcester, Mass.

St. Louis Branch

Theodore Riefling, Active.....4174 Botanical Ave., St. Louis, Mo.
Eugene Tomlinson, Active.....109 Cleveland Ave., Wichita, Kan.
Joseph T. Deters, Active.....648 Jackson St., Quincy, Ill.

REINSTATED

Chicago Branch

Harry C. Stewart, Associate.....842 W. Erie St., Chicago, Ill.

RESIGNED

Chicago Branch

J. A. Driscoll .....1419 Carroll Ave., Chicago, Ill.

THE CHICAGO BRANCH

ANNUAL BANQUET

will be held at Elks Club, 174 W. Washington Street, Chicago, Ill.

JANUARY 25, 1924

and the speakers for the evening are:

Dr. Wm. Blum, Bureau of Standards, Washington, D. C.

Dr. O. P. Watts, Prof. of Chemistry, University of Wis.

M. Joseph Haas, Jr., of Editorial Staff A. E. S. Review

The tickets are $2.50 per plate and the time is 6:30 p. m. sharp owing to the length of program and the interesting subjects of the speakers. We urge the attendance to be prompt. A good time is assured all.

The committee, headed by M. E. Lamoureux, chairman, has made provisions to take care of visiting ladies during the banquet.

Every Superintendent, Shop Foreman and Plater where nickel and various plating is done are urged to attend as this will be of vital interest to them and may have bearing on future development in the Plating Industry.

The tickets can be had from

MR. R. J. HAZUCHA

5128 Warwick Ave., Chicago, Ill.

and we would advise all to reserve early as a large attendance is expected and it is the wish of the committee to accommodate all.

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